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EXAMINER

NGUYEN, HANH N

ART UNIT PAPER NUMBER

2834

DATE MAILED: 06/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/826,422

Applicant(s)

MASLOV ET AL.

Examiner

HANH NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_.

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## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the energization of the windings in accordance with a preset sequential, non-sequential or random excitation scheme must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: "axial air gap" in Page 1, line 11 should be ---radial air gap---.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 17-21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is not clear how a non-

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sequential or random excitation scheme works to energize the windings in the electric motor.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1,3,5-9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Heidelberg et al.

Regarding claim 1, Heidelberg et al. disclose a rotary electric motor comprising: a stator configured in the form of an annular ring of groups of electromagnet poles (abstract), the groups substantially equidistantly distributed along the angular extent of the annular ring (Fig. 1 and Col. 4, lines 50-56), each of the groups comprising magnetic material magnetically isolated and separated from the other groups (Col. 2, lines 20-25); and an annular rotor (4 in Fig. 1), concentric with an axis of rotation and concentric with the annular stator to form a radial air gap therebetween, comprising a plurality of permanent magnet poles (magnet pole faces 18) substantially equidistantly distributed with alternating magnetic polarity along the angular extent of the air gap, the permanent magnet poles having a common magnetic return path (20); wherein each group of electromagnet poles comprises windings that are switchably energized for driving electromotive interaction between the stator and rotor (Col. 2, lines 25-30).

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Regarding claim 3, Heidelberg et al. also disclose a rotary electric motor further comprising a rotor position sensor (sensor 28, Col. 4, lines 55-65), wherein signals for switching energization of the windings are generated in response to the sensor.

Regarding claim 5, Heidelberg et al. also disclose a rotary electric motor wherein the angular distance between poles of each stator group is substantially uniform throughout the periphery of the stator and differs from the angular distance between stator poles of adjacent groups (Fig. 1 and Fig. 4a to 4c).

Regarding claim 6, Heidelberg et al. also disclose a rotary electric motor wherein the angular distance between poles of each stator group is independent of the angular distance between adjacent permanent magnet poles of the rotor (because the permanent magnets of the rotor are uniformly distributed, angular distance between the adjacent permanent magnet poles of the rotor can be varied and be different from the angular distance between the stator poles of each group).

Regarding claim 7, Heidelberg et al. also disclose a rotary electric motor wherein the angular distance between poles of each stator group is different from the angular distance between adjacent permanent magnet poles of the rotor as can be seen clearly in Fig. 1.

Regarding claim 8, Heidelberg et al. also disclose a rotary electric motor wherein the stator poles have pole faces extending in substantially equal angular distance along the air gap and the rotor permanent magnet poles have pole faces extending in substantially equal angular distance along the air gap (Fig. 1), the angular extent of the stator pole faces being different from the angular extent of the rotor pole faces (the

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angular extent of the stator pole faces being is less than the angular extent of the rotor pole faces).

Regarding claim 9, Heidelberg et al. also disclose a rotary electric motor wherein the stator pole faces are separated by gaps, the gaps between adjacent stator pole faces within each group being substantially equal and different from the gaps between adjacent stator groups as can be seen clearly in Fig. 1.

Regarding claim 11, Heidelberg et al. also disclose a rotary electric motor wherein the rotor surrounds the stator.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2, 12-15,17-21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heidelberg et al. in view of Hancock et al.

Regarding claim 2, Heidelberg et al. show all limitations of the claimed invention except showing a rotary electric motor wherein each stator group comprises no more than a single pair of poles, each pole having a winding configured to form a magnetic polarity opposite to the magnetic polarity of the other pole of the pair, wherein switched energization of the pole pair winding effects reversal of the magnetic polarities of the pole pair.

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However, Hancock et al. disclose a rotary electric motor wherein each stator group comprises no more than a single pair of poles, each pole having a winding configured to form a magnetic polarity opposite to the magnetic polarity of the other pole of the pair, wherein switched energization of the pole pair winding effects reversal of the magnetic polarities of the pole pair (Fig. 9a and 9b) for the purpose of preventing flux reversal between stator poles.

Since Heidelberg et al. and Hancock et al. are in the same field of endeavor, the purpose disclosed by Hancock et al. would have been recognized in the pertinent art of Heidelberg et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming stator groups comprising a single pair of pole as taught by Hancock et a. for the purpose of preventing flux reversal between stator poles.

Regarding claim 12, Heidelberg et al. disclose a rotary electric motor wherein the number of stator group is an odd number (5) but fail to show the number of poles within each group is an even number.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming stator groups comprising a single pair of pole (even number of poles) as taught by Hancock et al. for the purpose of preventing flux reversal between stator poles.

Regarding claim 13, Heidelberg et al. show all limitations of the claimed invention except showing a rotary electric motor wherein each stator group is individually secured in the stator annular ring structure, thereby facilitating independent removal and

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replacement of an individual stator group and a switched energization circuit component associated therewith.

However, Forbes et al. disclose a rotary electric motor wherein each stator group is individually secured in the stator annular ring structure (157 in Fig. 12), thereby facilitating independent removal and replacement of an individual stator group and a switched energization circuit component associated therewith (Fig. 7) for the purpose simplifying the maintenance of the motor.

Since Heidelberg et al. and Li are in the same field of endeavor, the purpose disclosed by Forbes et al. would have been recognized in the pertinent art of Heidelberg et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming individual pole pair groups and secure them to annual ring structure as taught by Li for the purpose of simplifying the maintenance of the motor.

Regarding claim 14, Forbes et al. also disclose a rotary electric motor wherein said motor further comprises: a plate member (157 in Fig. 12); and a shaft member (165) located at the axis of rotation wherein each-of said stator groups is secured to said plate member at a spaced radial distance from the axis of rotation; and said plate member is attached to said shaft member (Fig. 13) for the purpose of simplifying the maintenance of the motor.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming individual pole pair groups and secure them to the plate member at a spaced radial distance from the



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axis of rotation and secure the plate member to the shaft as taught by Forbes et al. for the purpose of simplifying the maintenance of the motor.

Regarding claim 15, it is noted that Heidelberg et al. also show a rotary electric motor as wherein said spaced radial distance is greater than the radial distance between inner and outer boundary diameters of the stator annular ring.

Regarding claim 17, Heidelberg et al. show a rotary electric motor having a stator and a rotor, the motor comprising: first and second annular ring members concentrically arranged about an axis of rotation and separated from each other by an axial air gap; wherein said first member (stator yoke in Fig. 1) comprises groups of electromagnet poles, the groups substantially equidistantly distributed along its annular ring, each of the groups comprising magnetic material magnetically isolated and separated from the other groups; said second member (rotor 4) comprises a plurality of permanent magnet poles substantially equidistantly distributed with alternating magnetic polarity along the air gap, the permanent magnet poles having a common magnetic return path (20) along its annular ring. The motor structure disclosed by Heidelberg et al. fails to show each group of electromagnet poles comprises windings that are switchably energized for driving electromotive interaction between the first and second members in accordance with a preset sequential, non-sequential or random excitation scheme.

However, Hancock et al. disclose a rotary electric motor wherein each group of electromagnet poles comprises windings that are switchably energized for driving electromotive interaction between the first and second members in accordance with a preset sequential scheme (Fig. 4a-4c and Col. 10, lines 10-35) for the purpose of providing a high efficiency electronically commutated reluctance motor.

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Since Heidelberg et al. and Hancock et al. are in the same field of endeavor, the purpose disclosed by Hancock et al. would have been recognized in the pertinent art of Heidelberg et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming a stator comprising windings that are switchably energized for driving electromotive interaction between the first and second members in accordance with a preset sequential scheme as taught by Hancock et al. for the purpose of providing a high efficiency electronically commutated reluctance motor.

Regarding claim 18, Heidelberg et al. also show a rotary electric motor wherein the rotor surrounds the stator.

Regarding claim 19, Heidelberg et al. also show a rotary electric motor wherein the stator (6) comprises said first annular ring member and the rotor comprises said second annular ring member.

Regarding claim 20, Heidelberg et al. also show a rotary electric motor wherein the annular stator comprises an inner boundary at a first radial distance from the axis of rotation and an outer boundary at a second radial distance from the axis of rotation, and the radial distance between the inner and outer boundaries is less than said first radial distance.

Regarding claim 21, Hancock et al. disclose a motor structure wherein the stator surrounds the rotor having plural of electromagnetic poles for the purpose of creating rotation of the rotor.

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It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming an rotary electric motor wherein the stator comprises said second annular ring member (with permanent magnets) and the rotor comprises said first annular ring member (with electromagnets) as taught by Hancock et al. for the purpose of creating rotation of the rotor.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heidelberg et al. in view of Li.

Regarding claim 4, Heidelberg et al. show all limitations of the claimed invention except showing a rotary electric motor wherein said position sensor comprises a resolver; and said motor further comprises an encoder for generating said signals.

However, Hancock et al. disclose a rotary electric motor wherein said position sensor comprises a resolver; and said motor further comprises an encoder for generating said signals (claim 6 and 7) for the purpose of detecting the position of rotor.

Since Heidelberg et al. and Li are in the same field of endeavor, the purpose disclosed by Li would have been recognized in the pertinent art of Heidelberg et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by using a resolver and an encoder in the rotary electric machine as taught by Li for the purpose of detecting the position of rotor.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heidelberg et al. in view of Li. *Forces*

Regarding claim 10, Heidelberg et al. show all limitations of the claimed invention except showing a rotary electric motor wherein the rotor pole faces are separated

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substantially uniformly by gaps, the gaps between adjacent rotor pole faces being different from the gaps between adjacent stator pole face within a stator group.

However, Forbes et al. disclose a rotary electric motor wherein the rotor pole faces are separated substantially uniformly by gaps, the gaps between adjacent rotor pole faces being different from the gaps between adjacent stator pole face within a stator group (Fig. 1) for the purpose of placing the permanent magnets in operating position.

Since Heidelberg et al. and <sup>Forbes</sup>Li are in the same field of endeavor, the purpose disclosed by Forbes et al. would have been recognized in the pertinent art of Heidelberg et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. by forming the gaps between adjacent rotor pole faces being different from the gaps between adjacent stator pole face within a stator group as taught by <sup>Forbes</sup>Li for the purpose of placing the permanent magnets in operating position.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heidelberg et al. in view of Hancock et al. and further in view of Li.

Regarding claim 16, Heidelberg et al. and Hancock et al. show all limitations of the claimed invention except showing a rotary electric motor wherein said motor further comprises a rotor housing, the rotor annular rotor being mounted within the housing at a spaced radial distance from the axis of rotation, and the rotor housing is journaled for rotation about the shaft through bearings.

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However, Forbes et al. disclose a rotary electric motor wherein said motor further comprises a rotor housing (11' in Fig. 1), the rotor annular rotor being mounted within the housing at a spaced radial distance from the axis of rotation, and the rotor housing is journaled for rotation about the shaft through bearings (74') for the purpose of mounting the rotor directly to the wheel of a bicycle.

Since Heidelberg et al., Hancock et al. and Li are in the same field of endeavor, the purpose disclosed by Forbes et al. would have been recognized in the pertinent art of Heidelberg et al. and Hancock et al.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Heidelberg et al. and Hancock et al. by including a rotor housing, the rotor annular rotor being mounted within the housing at a spaced radial distance from the axis of rotation, and the rotor housing is journaled for rotation about the shaft through bearings as taught by Li for the purpose of mounting the rotor directly to the wheel of a bicycle.

### **Conclusion**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh N Nguyen whose telephone number is (703) 305-3466. The examiner can normally be reached on Monday through Friday.

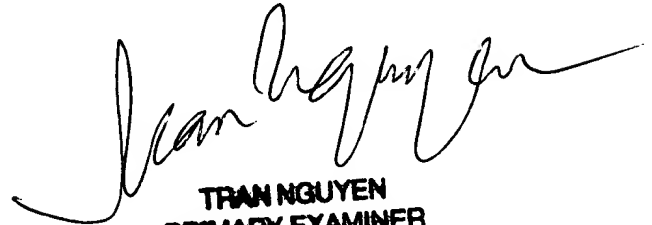
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

HNN

June 20, 2002



**TRAN NGUYEN**  
**PRIMARY EXAMINER**